

Name \_\_\_\_\_

## Study Guide for Advanced Biology Final

### Biochemistry Unit

1. Carbohydrates, lipids, proteins, and nucleic acids are \_\_\_\_\_ compounds because they contain - \_\_\_\_\_ chains. Oxygen, carbon dioxide, and water are \_\_\_\_\_ compounds because they do NOT contain \_\_\_\_\_ chains.
2. The main function of carbohydrates is to store and provide \_\_\_\_\_. Lipids such as \_\_\_\_\_ pad and insulate the body. \_\_\_\_\_ are a type of protein that control the rate of chemical reactions. \_\_\_\_\_ are information carrying molecules that play an important role in heredity and protein synthesis. ATP stores and provides \_\_\_\_\_.
3. Name the building blocks of each of the following types of molecules:
  - Carbohydrates \_\_\_\_\_
  - Lipids \_\_\_\_\_
  - Proteins \_\_\_\_\_
  - Nucleic Acids \_\_\_\_\_
4. Phospholipids are an important component of \_\_\_\_\_. Because their phosphate end is polar, it is attracted to water and is therefore considered \_\_\_\_\_. The other end is nonpolar and repelled by water, so it is considered \_\_\_\_\_.
5. A chain of amino acids is called a/an \_\_\_\_\_. 2 types of nucleic acids are \_\_\_\_\_ and \_\_\_\_\_.

### Cells Unit

6. A specialized part of a cell performing one or more specific functions is a/an \_\_\_\_\_. The outermost component of an animal cell, which is selectively permeable, is the \_\_\_\_\_.
7. Diffusion is the tendency for solutes to move from an area of \_\_\_\_\_ concentration to an area of \_\_\_\_\_ concentration. The diffusion of water across a selectively permeable membrane from a region of higher water concentration to one of lower water concentration is called \_\_\_\_\_.
8. A solution in which the concentrations of solutes and water are the same on both sides of the cell membrane is called a/an \_\_\_\_\_ solution. A/an \_\_\_\_\_ solution has a lower concentration of solutes and higher concentration of water than the cell's cytoplasm, so water moves \_\_\_\_\_ the cell. A/an \_\_\_\_\_ solution has a higher concentration of solutes and lower concentration of water than the cell's cytoplasm, so water moves \_\_\_\_\_ the cell.
9. The \_\_\_\_\_ is a major site of ATP production, which cells use as an energy source. Proteins are produced at the \_\_\_\_\_. The \_\_\_\_\_ contains most of the genetic information of the cell.
10. The \_\_\_\_\_ collects, modifies, and packages proteins and lipids. The \_\_\_\_\_ is a site for protein synthesis exportation and has ribosomes attached to it. The \_\_\_\_\_ is a site for lipid synthesis and detoxification and does not have ribosomes.

## Cell Division Unit

11. Somatic, or body cells, are considered \_\_\_\_\_ because they contain 2 sets of chromosomes and are formed by \_\_\_\_\_. Reproductive cells are considered \_\_\_\_\_ because they contain 1 set of chromosomes and are formed by \_\_\_\_\_. Programmed cell death is called \_\_\_\_\_.

12. Write the phases of mitosis in the correct order.

- 1.
- 2.
- 3.
- 4.

13. In mitosis, the longest phase is \_\_\_\_\_ and the shortest phase is \_\_\_\_\_. The nuclear envelope breaks down during \_\_\_\_\_ and reforms during \_\_\_\_\_. Chromosomes line up in the middle of the cell during \_\_\_\_\_, and the chromatids separate and move toward the centrioles at each end of the cell during \_\_\_\_\_.

14. Meiosis mixes up trait combinations, providing genetic diversity. As a result, which of the following are produced at the end of Meiosis II? (circle the correct choice in EACH row)

- 2 or 4 cells
- Identical or nonidentical cells
- Haploid or diploid cells

15. Identical copies of the same chromosome are called \_\_\_\_\_. Chromosome tips are called \_\_\_\_\_. The exchange of homolog parts is called \_\_\_\_\_.

## Transmission Genetics Unit

16. The “father of genetics” who demonstrated the inheritance of certain traits in pea plants follows particular patterns was \_\_\_\_\_. He determined that the \_\_\_\_\_ allele is always expressed when present in one copy but the \_\_\_\_\_ allele can be masked by another allele.

17. A \_\_\_\_\_ individual has two identical alleles of a gene but a \_\_\_\_\_ individual has two different alleles of a gene.

18. The expression of a gene in traits or symptoms is called a \_\_\_\_\_. The allele combinations in an individual that cause particular traits or disorders is called a \_\_\_\_\_.

19. A monohybrid cross results in a phenotypic ratio of \_\_\_\_\_ and a dihybrid cross results in a phenotypic ratio of \_\_\_\_\_.

20. Inheritance where the heterozygous phenotype is intermediate between that of either homozygous phenotype is called \_\_\_\_\_, and inheritance in which both alleles are fully expressed is called \_\_\_\_\_.

## DNA and Chromosomes Unit

21. The current 3-D double helix model of DNA structure was proposed by \_\_\_\_\_ and \_\_\_\_\_. A chromosome chart is called a/an \_\_\_\_\_.
22. What are the 3 components of a nucleotide?
- - 
  -
23. Which of the following is true regarding DNA? (circle the correct choice in EACH row)
- Single stranded or double stranded
  - Strands are complementary or identical
  - Strands are parallel or antiparallel
  - Replication is conservative, semiconservative, or dispersive
24. In DNA, the base thymine forms a complementary base pair with \_\_\_\_\_ and the base cytosine forms a complementary base pair with \_\_\_\_\_.
25. A missing sequence of DNA is called a/an \_\_\_\_\_, while an extra copy of a DNA sequence is called a/an \_\_\_\_\_. Trisomy 21 is also known as \_\_\_\_\_.

## Gene Action: From DNA to Protein Unit

26. The structure of DNA is \_\_\_\_\_ stranded while RNA is \_\_\_\_\_ stranded. The sugar found in DNA is \_\_\_\_\_ and the sugar found in RNA is \_\_\_\_\_.
27. While both DNA and RNA contain the nitrogenous bases adenine, guanine, and cytosine, DNA contains the nitrogenous base \_\_\_\_\_ but RNA contains \_\_\_\_\_ (which forms a complementary base pair with adenine).
28. The process of copying a gene's DNA sequence into a sequence of RNA is called \_\_\_\_\_ and the assembly of an amino acid chain to make a protein according to the sequence of base triplets in a molecule of mRNA is called \_\_\_\_\_.
29. A continuous triplet of mRNA that specifies a particular amino acid is called a/an \_\_\_\_\_. The three base sequence on one loop of tRNA molecule that is complementary to an mRNA codon and carries the appropriate amino acid is called a/an \_\_\_\_\_.
30. Which of the following is true regarding the genetic code? (circle the correct choice in EACH row)
- Couplet or triplet
  - Overlapping or nonoverlapping
  - Continuous or discontinuous
  - Universal or species specific
  - Degenerate with synonymous codons or non-degenerate with only non-synonymous codons